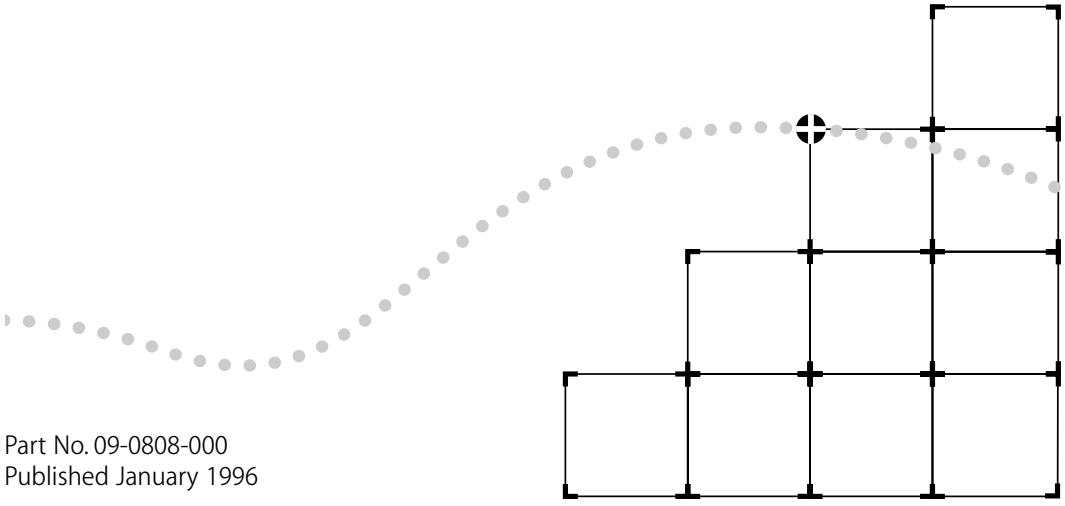
Fast EtherLink® Parallel Tasking® 10/100BASE-T4 PCI Network Adapter User Guide

A member of the 3Com Fast EtherLink family of adapters



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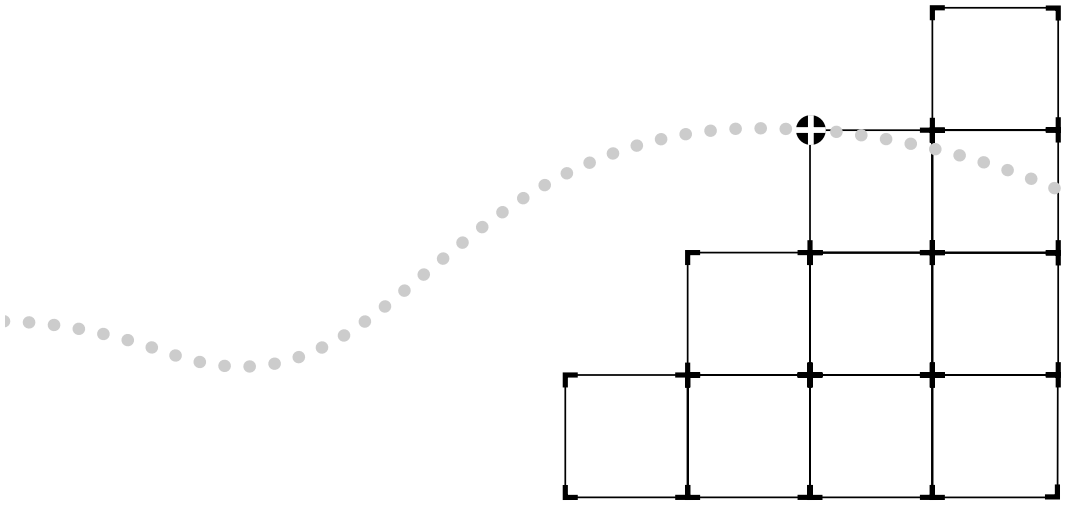

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Contents

About This Guide

Introduction 1

How to Use This Guide 1

Conventions 2

1 Introduction

Adapter Features 1-3

PCI Technology 1-4

2 Installing the Adapter

Inspecting the Adapter 2-1

Installing the Boot PROM 2-2

Installing the Adapter 2-2

Connecting to the Network 2-3

3 Loading the Network Drivers

Summary of Driver Loading Procedures 3-1

Using the *EtherDisk* Diskette 3-2

Accessing DOS 3-2

Using Windows 95 3-3

- Confirming Adapter Installation for Windows 95 3-4

Using NetWare ODI 3-5

- One Adapter in a Client 3-5
  - AutoLink Requirements 3-5
  - AutoLink Installation 3-6
- Multiple Adapters in a Client 3-8
  - Finding the Adapter's Port Number 3-10
- One or More Adapters in a Server 3-11

Downloaded from www.Manualslib.com manuals search engine

Loading NDIS Drivers 3-11
Updating NDIS Drivers 3-12
Auto Select Media Type 3-12
Transcend PC Link SmartAgent Driver Agents 3-13
Desktop Management Interface 3-13

4 Performing Troubleshooting and Diagnostic Tests

Troubleshooting with the Diagnostic Tests 4-1
Before Running the Tests 4-2
Types of Tests 4-2
Starting the Diagnostic Program 4-3
Running the Group 1 Tests 4-3
Running the Group 3 Test 4-4
Setting Up an Echo Server 4-5
Starting the Group 3 Test 4-6
Getting Help If a Test Fails 4-7
Changing the Test Setup 4-9
Miscellaneous Checks 4-9
LEDs 4-10

A Cabling

Adapter Cabling Requirements A-1
Twisted-Pair Cable A-2
10BASE-T Operation A-3
10BASE-T Specifications A-3
100BASE-T Standard A-4
100BASE-TX Operation A-4
100BASE-T4 Operation A-5
100BASE-FX Operation A-5
RJ-45 Connector Pin Assignments A-6

B Configuring Software Settings

Changing Software Settings B-2

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C SPECIFICATIONS
Adapter Specifications C-1
Network Interface C-1
Physical Dimensions C-1
Environmental Operating Range C-1
Power Requirements C-1

D TECHNICAL SUPPORT
On-line Technical Services D-1
3Com Bulletin Board Service D-1
Access by Modem D-1
Access by ISDN D-2
World Wide Web Site D-2
3ComForum on CompuServe D-2
3ComFacts Automated Fax Service D-3
Support from Your Network Supplier D-3
Returning Products for Repair D-4

GLOSSARY

INDEX

LIMITED WARRANTY

FCC CLASS B CERTIFICATION

CISPR B COMPLIANCE

CE NOTICE

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FIGURES

1-1 10/100BASE-T4 PCI Adapter 1-2

2-1 PCI Computer with PCI and EISA Slots 2-3
2-2 Connecting Twisted-Pair Cable 2-4

3-1 AutoLink Information Screen 3-7
3-2 Main Menu 3-7

A-1 RJ-45 Connector Pin Assignments A-6

B-1 Multiple Adapter Option Configuration B-3
B-2 Changing Adapter Options B-4

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TABLES

1 Text Conventions 2

2 Notice Icons 2

3-1 Summary of Driver Loading Procedures 3-1

3-2 Accessing DOS from Other Operating Systems 3-3

4-1 Adapter and Diagnostic Program Names (10 Mbps Adapter Only) 4-6

4-2 Fast EtherLink 10/100BASE-T4 PCI Adapter LEDs 4-10

B-1 Option Settings B-2

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About This Guide

Introduction

This guide explains how to install the 3Com® Fast EtherLink® Parallel Tasking® 10/100BASE-T4 PCI adapter. Also included is information about loading drivers, troubleshooting the adapter, and using the diagnostic tests if a malfunction occurs.

How to Use This Guide

The following table shows where to find specific information in this guide.

If you are looking for:	Turn to:
Overview of the Fast EtherLink 10/100BASE-T4 PCI adapter	Chapter 1
Instructions for installing the adapter	Chapter 2
Procedures for connecting the adapter to the network	Chapter 2
Instructions for loading network drivers	Chapter 3
Details on troubleshooting and running the diagnostic tests	Chapter 4
Information about 10/100 Mbps cabling standards	Appendix A
Procedures for changing default configuration settings	Appendix B
A list of the adapter's technical specifications	Appendix C
3Com technical support information	Appendix D

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Conventions

The following tables list text and icon conventions that are used throughout this guide:

Table 1 Text Conventions

Convention	Description
Text represented as `screen display`	`This typeface` is used to represent displays that appear on your terminal screen, for example: `NetLogin:`
Text represented as **`commands`**	**`This typeface`** is used to represent commands that you enter, for example: **`print autolink.log`**
Keys	When specific keys are referred to in the text, they are called out by their labels, such as "the Return key" or "the Escape key," or they may be shown as [Return] or [Esc]. If two or more keys are to be pressed simultaneously, the keys are linked with a plus sign (+), for example: Press [Ctrl]+[Alt]+[Del].

Table 2 Notice Icons

Icon	Type	Description
	Information Note	Information notes call attention to important features or instructions.
	Caution	Cautions alert you to personal safety risk, system damage, or loss of data.
	Warning	Warnings alert you to the risk of severe personal injury.

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1 INTRODUCTION

The 3Com® Fast EtherLink® Parallel Tasking® 10/100BASE-T4 PCI adapter is a 32-bit adapter for use in a personal computer with a Peripheral Component Interconnect (PCI) computer bus. It operates whether or not bus mastering is enabled.

This adapter (model number 3C595-T4) is a dual-speed adapter that can be connected to an Ethernet or Fast Ethernet network with a single connection over unshielded twisted-pair (UTP) cable. The adapter supports all UTP cable types, including Category 3, 4, and 5 UTP as well as screened Category 5 UTP. For 10BASE-T operation, the 10/100BASE-T4 adapter requires two pairs of Category 3, 4, or 5 UTP. For 100BASE-T4 operation, the 10/100BASE-T4 requires four pairs of Category 3, 4, or 5 UTP.

The adapter automatically senses and switches to either 10 Mbps or 100 Mbps operation depending on the type of hub to which the adapter is connected, as follows:

- When the adapter is connected to a hub that supports 10BASE-T Ethernet (10 Mbps), it switches to a network speed of 10 Mbps.
- When the adapter is connected to a hub that supports 100BASE-T4 Fast Ethernet, it switches to a network speed of 100 Mbps.

The bus master drivers supplied with this adapter are compatible with the Fast EtherLink 10/100BASE-TX PCI and EISA adapters. The bus master drivers shipped on the 3C59X *EtherDisk*® diskette are compatible with the 3C59X family of adapters; they are not backward-compatible with the 3C5X9 family of EtherLink III adapters.

The computer's PCI BIOS automatically configures the I/O port address and IRQ. All other required parameters are set to factory-default values.

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The 10/100BASE-T4 PCI adapter connects your PCI-compliant personal computer to an Ethernet network wired with IEEE 802.3 standard 10BASE-T or 100BASE-T4 twisted-pair cable. For information on the IEEE 802.3 standard as it relates to twisted-pair cable, refer to Appendix A.

The adapter interoperates with all 10BASE-T products and all 10/100 T4 adapters and hub products. It is compatible with 3Com's SNMP network management software (Transcend® WorkGroup Manager).

The 10/100BASE-T4 PCI adapter (shown in Figure 1-1) can be installed in any PCI slot, either master or non-bus master. However, the adapter will produce higher levels of performance in a bus master slot.

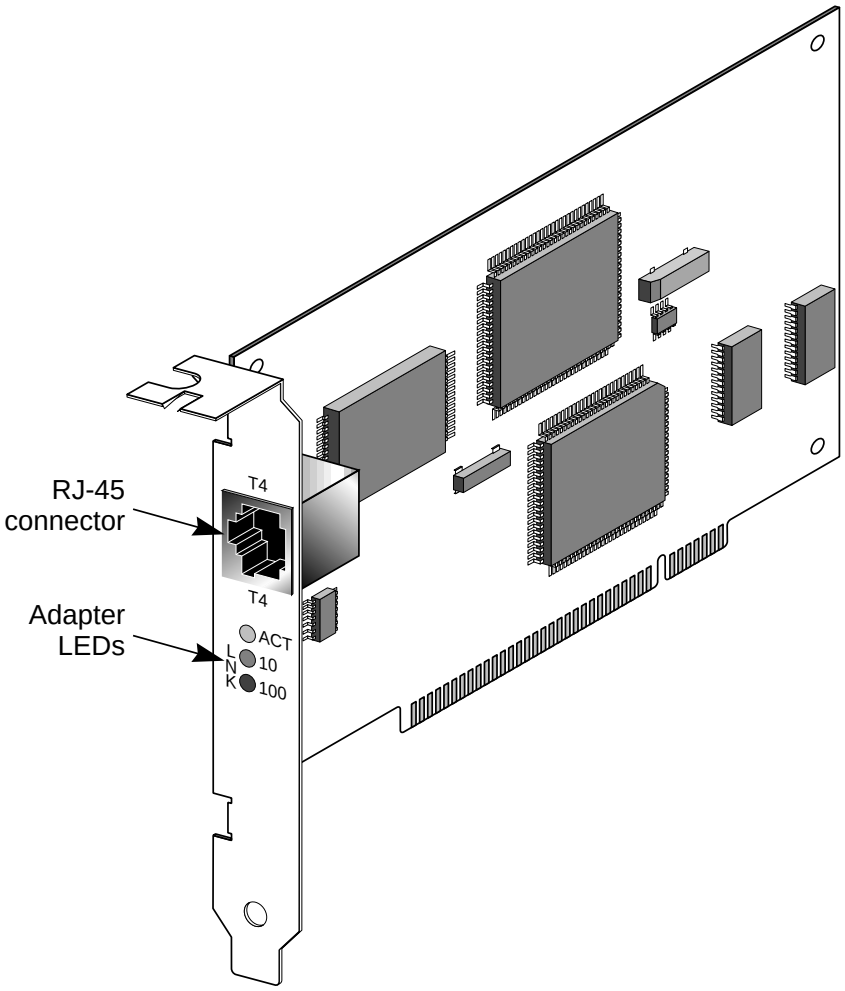

Figure 1-1 10/100BASE-T4 PCI Adapter

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Check the documentation provided with the PCI computer to locate the bus master slots.

Adapter Features

The 10/100BASE-T4 PCI adapter provides the following features:

- Parallel Tasking architecture with bus mastering for high throughput and low processor utilization
- Automatic selection of 10 or 100 Mbps network operation
- Single-slot, 32-bit half-card
- Automatic PCI configuration without jumpers
- Three status LEDs, shown in Figure 1-1
- Single shielded RJ-45 connector for use at either speed (2 pair Category 3, 4, or 5 for 10BASE-T Ethernet networks, and 4 pair Category 3, 4, or 5 UTP for 100BASE-T4 Fast Ethernet networks)
- Diagnostic software and drivers on the 3C59X *EtherDisk* diskette
- AutoLink™ auto installation software, which installs and configures all Novell® NetWare® DOS ODI client software on your operating system
- Auto Select Media Type capability, which enables drivers to automatically detect the speed of the media that connects the adapter to the network
- The Desktop Management Interface (DMI), which increases the manageability of PCs by standardizing how information relating to PCs is made available and how it is accessed

The 10/100BASE-T4 PCI adapter can be managed remotely with Transcend PC Link SmartAgent® software. Driver agents for this adapter are provided on the 3C59X *EtherDisk* diskette.

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PCI Technology

The PCI local bus is a high-performance bus that provides a processor-independent data path between the CPU in a PC and high-speed peripherals. This interconnect mechanism is designed specifically to accommodate multiple high-performance peripheral devices that support networking and disk subsystems, graphics, full-motion video, and multimedia.

The PCI specification defines two types of PCI devices: a target and a master. A target is a device that accepts commands and responds to the requests of a master. The Fast Ethernet PCI T4 adapter is a bus master device that can transfer information directly to system memory without interrupting the system processor.

The PCI specification supports the following:

- **High performance.** The PCI bus runs at a clock speed of 33 MHz and employs a 32-bit data bus that supports multiple peripheral components and add-on cards at a peak bandwidth of 132 Mbps, up to an order of magnitude greater than that of other PC buses (ISA, EISA, or MCA).
- **Automatic configuration.** A PCI adapter has configuration specifications set in on-board memory and provides installation information to the computer at start-up.
- **Shared slots.** The PCI specification calls for "shared slots," which denotes the shared expansion backplate slot. This shared backplate slot provides access to one of two types of adapters: a PCI adapter and an ISA adapter, for example, or a PCI adapter and an EISA adapter. Only one adapter at a time can be installed in a shared slot. Manufacturers are currently producing computers that support the PCI bus in conjunction with conventional ISA and EISA buses in the same chassis.

For detailed information about the PCI local bus, consult the PCI specification.

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2 Installing the Adapter

This chapter discuses the following topics:

- Inspecting the Fast EtherLink 10/100BASE-T4 PCI adapter
- Installing the boot PROM
- Inserting the adapter
- Connecting to the network

Inspecting the Adapter

Before installing the adapter in your computer, you should visually inspect it for damage that might have occurred during shipment from the factory.

CAUTION: *Each adapter is packed in an antistatic container to protect it during shipment. To avoid damaging any static-sensitive components after removal from the container, be sure to reduce any static electricity on your person. One way to do this is to touch the metal chassis of your computer. You can maintain grounding by wearing a wrist strap attached to the chassis.*

1 Open the shipping container and carefully remove its contents.

The package should contain the following items:

- 3Com Fast EtherLink Parallel Tasking 10/100BASE-T4 PCI adapter
- *Fast EtherLink Parallel Tasking 10/100BASE-T4 PCI Adapter User Guide*
- 3C59X *EtherDisk* diskette (version 5.1 or above)

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2 **Verify that you have received all items listed in step 1, and inspect each item for damage.**

If you find any omissions or damage, contact your network supplier and the carrier that delivered the package.

Installing the Boot PROM

The boot PROM is optional and can be purchased separately. If you are installing it onto the adapter, follow the instructions that accompanied the boot PROM.

Installing the Adapter

This adapter is equipped with a backplate that allows installation of the Fast EtherLink 10/100BASE-T4 PCI adapter *in any standard PCI computer with ISA or EISA slots. The slot can be a bus master slot or a non-bus master slot.*

To install the adapter into the computer, follow these steps:

1 **Unplug the computer and disconnect all cables that are connected to the main system unit.**

2 **Remove all jewelry from your hands and wrists.**

3 **Use only insulated or nonconductive tools.**

4 **Remove the computer's cover and select any of the available PCI expansion slots.**

5 **Insert the adapter in the slot and secure the screw.**

The PCI slots in some PCI computers need to be enabled with a special setup program. Refer to your hardware documentation to see if this is necessary.

Install the Fast EtherLink 10/100BASE-T4 PCI adapter only in a PCI slot (see Figure 2-1).

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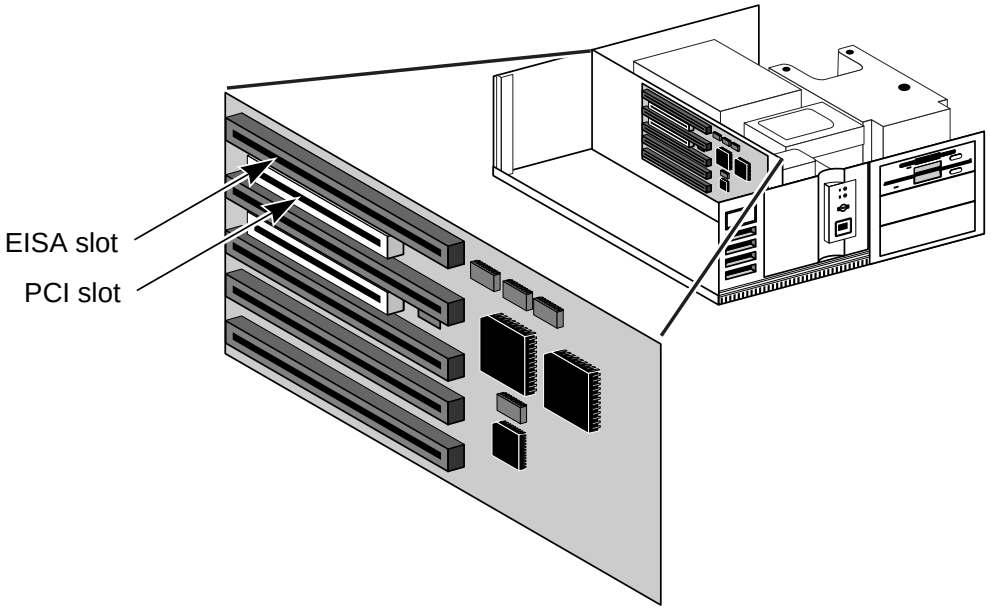

Figure 2-1 PCI Computer with PCI and EISA Slots

The adapter's backplate should be flush with the computer's chassis. Be sure that the adapter's connector fingers are completely seated in the slot.

6 Replace the computer cover and reconnect all previously connected cables.

Refer to the documentation provided by the computer's manufacturer for details on installing expansion boards.

Connecting to the Network

This section describes how to connect the Fast EtherLink 10/100BASE-T4 PCI adapter to the network.

You must connect the adapter to the network before loading drivers.

The backplate of the Fast EtherLink PCI adapter contains one RJ-45 connector, as shown in Figure 1-1. The adapter automatically senses and switches speed based on the type of hub to which it is connected.

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For both 10BASE-T and 100BASE-T4 Ethernet networks, the Fast EtherLink PCI adapter uses Category 3, 4, or 5 unshielded twisted-pair (UTP) cable. Refer to Appendix A for more information on cabling.

Figure 2-2 shows the backplate of an installed adapter with its RJ-45 connector.

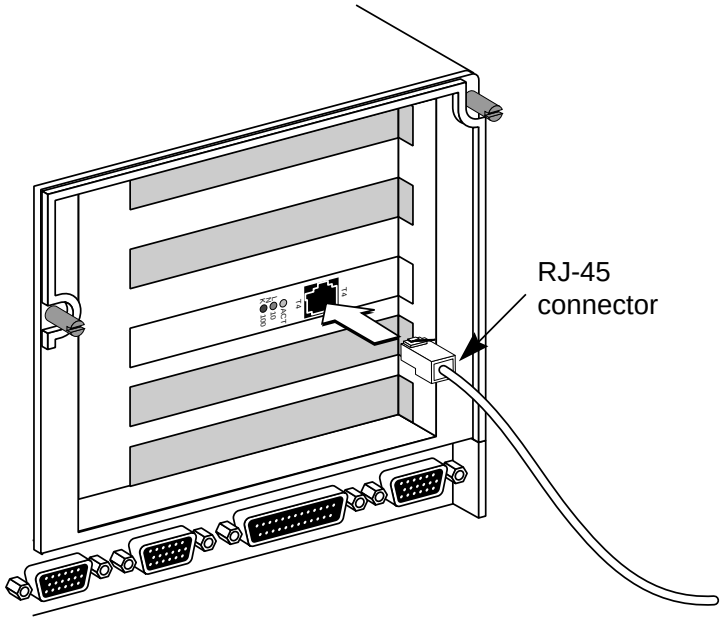

Figure 2-2 Connecting Twisted-Pair Cable

The Fast EtherLink 10/100BASE-T4 PCI adapter is equipped with an on-board transceiver for connection to twisted-pair cable. To establish a valid 10 Mbps connection, the cable must be connected to a 10BASE-T hub. To establish a valid 100 Mbps connection, the cable must be connected to a 100BASE-T4 hub.

Connect the network cable as follows:

1 **Make sure that the connector on your cable is wired appropriately for standard 10BASE-T or 100BASE-T4 adapters.**

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100BASE-T4 connections use all 4 pairs of wire normally contained in a bundle of Category 3, 4, or 5 UTP cable. The "straight through" connection should be made from the Fast EtherLink PCI adapter through the cable and connectors to the hub. No crossover in the cable is required.

Refer to Appendix A for RJ-45 connector pin assignments.

2 Align the RJ-45 connector on the end of the twisted-pair cable with the notch on the adapter's connector and insert it into the adapter connector.

3 For 100 Mbps operation, be sure the connection is to a 100BASE-T4 hub port.

4 The next step is to install network drivers, as explained in Chapter 3.

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3 Loading the Network Drivers

This chapter describes how to load the network drivers required to let the 3C595-T4 PCI adapter operate with your network operating system. This information is arranged according to the following topics:

- Summary of driver loading procedures
- Using the *EtherDisk* diskette
- Accessing DOS
- Loading network drivers

Summary of Driver Loading Procedures

Table 3-1 summarizes the driver loading procedures based on the network operating system running on your computer.

Table 3-1 Summary of Driver Loading Procedures

Network Operating System	Driver Loading Procedure
Windows 95	Windows 95 will detect the presence of the T4 adapter and request a driver for it. Refer to the section "Using Windows 95."
NetWare ODI: client environment	AutoLink auto installation software loads all NetWare client software, including drivers, if a single adapter is being installed in a NetWare DOS ODI client. Refer to the section "One Adapter in a Client" under "Using NetWare ODI."
NetWare ODI: server environment (versions 3.1X, 4.0X, 4.X)	Load the appropriate server drivers from the *EtherDisk* diskette. Refer to the section "One or More Adapters in a Server" under "Using NetWare ODI."
DEC® PATHWORKS® Banyan® VINES® IBM® LAN Server Microsoft® LAN Manager Artisoft® LANtastic®	Load the appropriate NDIS driver from the *EtherDisk* diskette. Refer to the section "Loading NDIS Drivers."
Windows NT 3.5x Windows for Workgroups	Follow the instructions in the README.TXT file on the *EtherDisk* diskette. If updating a driver, refer to the section "Updating NDIS Drivers."

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Using the *EtherDisk* Diskette

The *EtherDisk* diskette contains the latest versions of the network drivers available when 3Com shipped the adapter. It also contains other important information concerning Fast EtherLink and EtherLink III adapters and their configuration.

To obtain network operating system drivers not included on the EtherDisk *diskette, contact the manufacturer of that network operating system or application. To obtain a list of supported drivers along with software driver updates and patches for the drivers on the* EtherDisk *diskette, use one of the bulletin board services listed in Appendix D. For example, Document 9071 in 3Com's automated fax service contains a list of all available drivers and drivers still being developed.*

Refer to your network operating system manuals for specific instructions for using the driver with your network operating system.

The drivers on the 3C59X EtherDisk *diskette are compatible with the following bus master adapters:*

- *Fast EtherLink PCI 10/100BASE-T (3C595)*
- *EtherLink III PCI 10 Mbps (3C590)*
- *Fast EtherLink EISA 10/100 (3C597)*
- *EtherLink III EISA 10 Mbps (3C592)*

The 3C59X drivers are not backward-compatible with the 3C5X9 family of EtherLink III adapters (ISA, EISA, or MCA).

Accessing DOS

The 3Com program for loading drivers is a DOS-based program that loads network drivers, modifies some adapter parameters, and runs diagnostic tests on the adapter. If you are using an operating interface other than DOS, such as OS/2® or Windows 3.x, and you want to use the *EtherDisk* diskette to load the drivers, you must exit from that interface before

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installing the drivers. Table 3-2 provides the procedures to use to access DOS from various operating systems.

Table 3-2 Accessing DOS from Other Operating Systems

Operating System	Procedure
Windows 95	**1** Turn on your computer. **2** Press [F8] as soon as you see this message: `Starting Windows 95` **3** Press [7], then press [Enter]. **4** Type `install` at the DOS command prompt to run the 3Com install program.
OS/2	**1** Boot your computer from a plain DOS diskette. **2** Type `install` at the DOS command prompt to run the 3Com install program.
Windows 3.x	**1** Exit Windows completely (select File, Exit Windows, OK). **2** Type `install` at the DOS command prompt to run the 3Com install program.

Using Windows 95

If you have Windows 95 running on your computer, you should load the driver from the *EtherDisk* diskette. Follow these steps:

1 After inserting the Fast EtherLink PCI adapter and connecting it to the network, turn on your computer.

Windows 95 will notify you that new hardware has been found and is located in slot number "X."

2 Select the following option when prompted for the driver for your new hardware:

`Driver from disk by hardware manufacturer`

3 Click OK.

4 You are prompted to insert the manufacturer's disk into the drive selected.

a Insert the *EtherDisk* diskette.

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b In the panel at the bottom of the dialog box, type the drive name and pathname from which Windows 95 should copy the manufacturer's files.

(An information file on the diskette tells Windows 95 where to find the information it needs, for example A:\.)

5 Click OK.

This imports the driver from the *EtherDisk* diskette.

For on-line help information about any of the fields in the Windows 95 display boxes, click the question mark (?) in the upper right corner of the box and move the cursor to the field of interest and click again.

Confirming Adapter Installation for Windows 95

To confirm that the 10/100BASE-T4 PCI adapter is properly installed in your computer running Windows 95, complete the following:

1 Double-click the *My Computer* icon.

2 Double-click the *Control Panel* icon.

3 Double-click the *System* icon.

The System Properties box appears, detailing your system setup.

4 Click the *Device Manager* tab.

A list of devices appears, arranged by type.

5 Click the *Network Adapters* tab.

The name of the installed 3Com adapter appears, as follows:

```
3Com Fast EtherLink 10/100 Mb Bus-Master PCI
Ethernet Adapter
```

This confirms the adapter's installation.

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6 **Double-click the adapter name to display a description of the adapter and its current status.**

The next dialog box confirms that the adapter is working properly.

7 **Click the *Cancel* button to leave each dialog box and return to the Control Panel.**

Using NetWare ODI

This section describes how to load NetWare drivers in the following networking situations:

- One or more adapters in a client
- One or more adapters in a server

One Adapter in a Client

3Com's AutoLink installation program automatically installs all necessary NetWare DOS ODI client software, including drivers and modifies the CONFIG.SYS and AUTOEXEC.BAT files. It automatically logs on to the server and updates the client software if your system administrator has already configured a 3Install account on the server. Instructions for configuring a 3Install account are contained in the README.TXT file located in the \QINSTALL\SERVER directory on the 3C59X *EtherDisk* diskette.

AutoLink Requirements

To use the AutoLink program to install the NetWare DOS ODI driver, your computer must meet the following requirements:

- Use the Novell NetWare 2.x, 3.1x, or 4.x network operating system
- Have only one 3C595-T4 adapter installed
- Have at least 1 MB of hard disk space available
- Be intended for use as a NetWare DOS ODI client

If this does not describe your network environment, refer to the appropriate section later in this chapter.

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AutoLink Installation

To use the AutoLink program to install NetWare DOS ODI client software on a PC with a single adapter, follow these steps:

1 **Make sure that you have booted the computer under DOS, version 3.1 or later, and that your computer is connected to the network, as detailed in Chapter 2.**

2 **Insert the *EtherDisk* diskette in a floppy drive on your computer and make that drive the active drive.**

For example, if the floppy drive is A, type the following command:

```
A: [Enter]
```

3 **At the prompt, type:**

```
INSTALL [Enter]
```

Alternatively, at the prompt, type:

```
AUTOLINK [Enter]
```

If you type AUTOLINK instead of INSTALL, you will bypass the EtherDisk *diskette menu program (skipping steps 5 and 6) and advance to step 7.*

4 **The first time you use the diskette to install an adapter, a license screen appears. To accept the terms and conditions of the 3Com end-user software license agreement, type the following:**

```
Y
```

To view the full text of the license agreement, press [F1].

Once you have agreed to the terms and conditions of the 3Com license agreement, the license screen will not appear again.

The Auto Installation Information screen appears, as shown in Figure 3-1.

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5 Read the screen and press [Enter].

6 When the main menu screen shown in Figure 3-2 appears, select *NetWare DOS ODI Client*, and press [Enter].

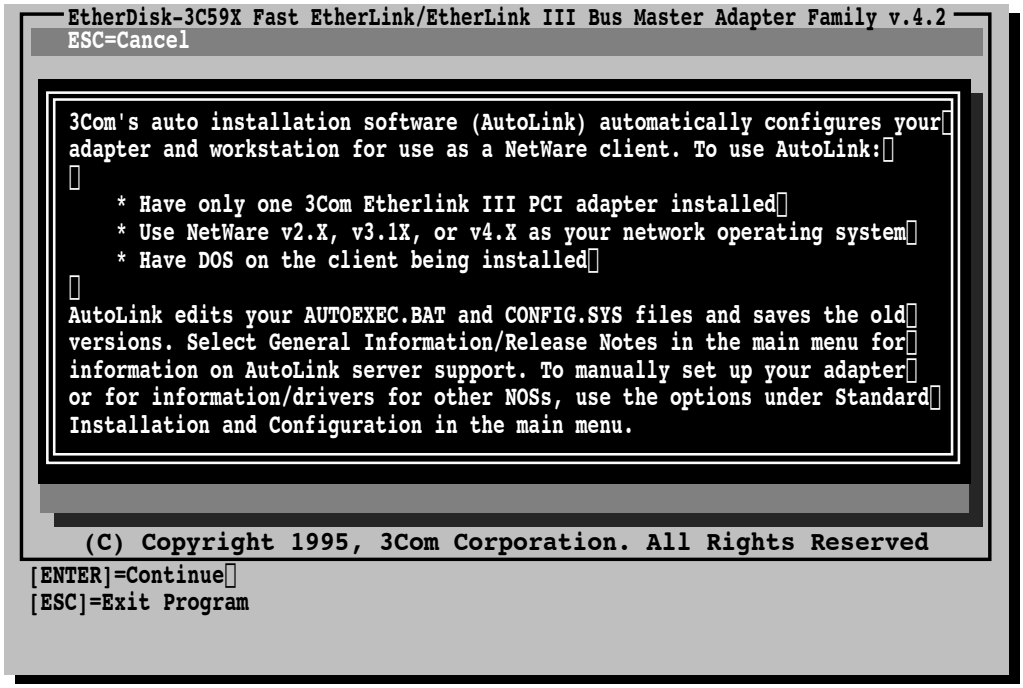
EtherDisk-3C59X Fast EtherLink/EtherLink III Bus Master Adapter Family v.4.2
ESC=Cancel
3Com's auto installation software (AutoLink) automatically configures your adapter and workstation for use as a NetWare client. To use AutoLink:
* Have only one 3Com Etherlink III PCI adapter installed
* Use NetWare v2.X, v3.1X, or v4.X as your network operating system
* Have DOS on the client being installed
AutoLink edits your AUTOEXEC.BAT and CONFIG.SYS files and saves the old versions. Select General Information/Release Notes in the main menu for information on AutoLink server support. To manually set up your adapter or for information/drivers for other NOSs, use the options under Standard Installation and Configuration in the main menu.
(C) Copyright 1995, 3Com Corporation. All Rights Reserved
[ENTER]=Continue
[ESC]=Exit Program

Figure 3-1 AutoLink Information Screen

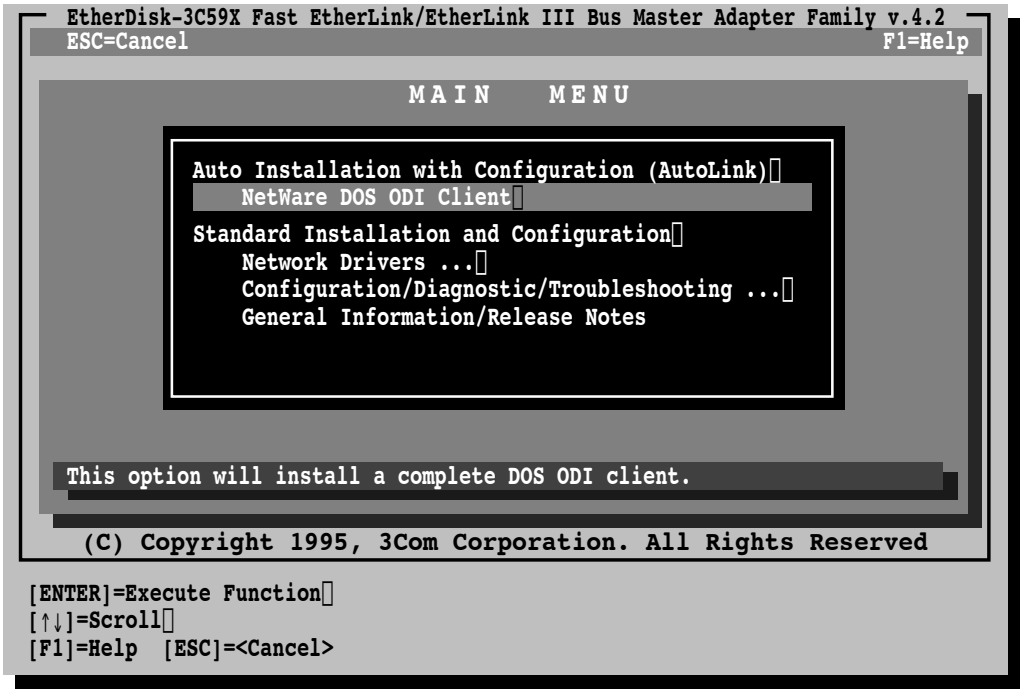

Figure 3-2 Main Menu

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Auto installation may take a few moments. Several messages appear while the AutoLink program is running. A final message indicating successful installation appears.

If you experience problems that occur only when using the AutoLink program, access the AUTOLINK.LOG file, as described in the section "Getting Help If a Test Fails" in Chapter 4.

7 When the auto installation process is finished, remove the diskette and reboot the computer.

When you do this, a DOS ODI client starts.

This concludes the procedure for installing a single adapter in a NetWare DOS ODI client using the AutoLink program.

Multiple Adapters in a Client

Use multiple adapters in a client only if you plan to run multiple protocols or to connect to more than one network. For information on running multiple protocols, refer to the documentation accompanying your operating system.

Before proceeding, make sure you know each adapter's port number. To find the adapter's port number, refer to the next section, "Finding the Adapter's Port Number."

If you are running NetWare and you need to install multiple 10/100BASE-T4 PCI adapters in a client computer, follow these steps to load the NetWare ODI drivers:

1 Make sure your computer is turned off. Install the first adapter.

2 Connect the network cable to the adapter.

3 Turn on the computer, insert the *EtherDisk* diskette, and run the AutoLink program.

Refer to the section "AutoLink Installation" earlier in this chapter for instructions.

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4 When the AutoLink installation is complete, remove the diskette.

5 Turn off the computer, install the second adapter, and connect the network cable to the adapter.

6 Turn on the computer and access the C:\NWCLIENT subdirectory.

7 In the C:\NWCLIENT subdirectory access the NET.CFG file by typing:

```
edit net.cfg
```

8 Scroll through the NET.CFG file to the LINK DRIVER 3C59X section.

In the LINK DRIVER 3C59X section, you will see the Link Driver statement that was created during the AutoLink installation process. A sample Link Driver statement is shown below:

```
LINK DRIVER 3C59X
    Frame Ethernet_802.2
    FED0
    int 3
```

9 Copy the Link Driver statement, paste it below the first statement, and edit it to reflect the second installed adapter. For example:

```
LINK DRIVER 3C59X
    Frame Ethernet_II
    FEA0
    int 11
```

The frame types (Frame Ethernet_802.2, Frame Ethernet_II), port designations (FED0, FEA0), and interrupts (int 3, int 11) shown above are examples; yours may be different. Refer to the section "Changing Software Settings" in Appendix B for instructions for changing interrupt levels.

Each frame type, port number, and interrupt must be different, as shown in the example above. Refer to Novell's DOS ODI client manual for information on the frame types to use.

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10 **Repeat step 9 for any additional adapters that you may have installed.**

11 **Reboot the computer.**

Finding the Adapter's Port Number

When working in a NetWare environment with multiple adapters in a client computer, you must know each adapter's port number. To find the adapter's port number after inserting the adapters, follow these steps.

1 **Access the main menu on the *EtherDisk* diskette.**

a Boot the computer under DOS.

b Insert the *EtherDisk* diskette in a floppy drive and make that drive the active one.

c At the prompt, type:

```
INSTALL [Enter]
```

The main menu appears.

2 **Select *Configuration/Diagnostic/Troubleshooting*, and press [Enter].**

3 **Select *Configuration and Diagnostic Program* and press [Enter].**

The next screen lists the installed adapters.

4 **Select each adapter individually, press [Enter], and select *Display Configuration*.**

The port number appears with each listed adapter.

5 **Exit the program.**

If you are using an ODI driver with multiple adapters already installed and you have not updated the NET.CFG file, specify which adapter you want the driver to recognize by adding the port number to the NET.CFG file using the PORT XXX parameter, where XXX is the port number.

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One or More Adapters in a Server

If you are running NetWare and have installed one or more adapters in a PCI computer that is functioning as a server, follow the instructions in the readme file on the *EtherDisk* diskette to load the NetWare 4.x server driver.

The 3C59X *EtherDisk* diskette contains the NetWare 4.x server driver (3C59X.LAN) and the NetWare Loadable Modules (NLMs) that enable the NetWare 4.x server driver to be used with NetWare 3.11, 3.12, 4.0x, or 4.1 software.

For complete details on loading the NetWare 4.x server driver, refer to the following readme files in the \NETWARE\SERVER subdirectory:

README.40X
README.41
README.311
README.312

Loading NDIS Drivers

To load the NDIS driver in a computer running one of the following network operating systems, complete these steps.

- DEC PATHWORKS
- Banyan VINES client
- IBM LAN Server
- Microsoft LAN Manager
- Artisoft LANtastic

1 Follow steps 1 through 5 in the section "AutoLink Installation" earlier in this chapter.

2 When the main menu screen shown in Figure 3-2 appears, select *Network Drivers* and press [Enter].

3 When the Network Drivers screen appears, select *NDIS Driver Installation and Information* and press [Enter].

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4 From the displayed list of network operating systems select the appropriate operating system for your environment and press [Enter].

5 Follow the instructions on the subsequent screen to load the driver.

Updating NDIS Drivers

To update one of the following drivers, complete these steps.

- DOS NDIS 2.01 driver
- OS/2 NDIS 2.01 driver
- Windows NT 3.5 driver
- Windows for Workgroups NDIS 3 driver

1 Follow steps 1 through 5 in the section "AutoLink Installation" earlier in this chapter.

2 When the main menu screen shown in Figure 3-2 appears, select *Network Drivers* and press [Enter].

3 When the Network Drivers screen appears, select *NDIS Driver Installation and Information* and press [Enter].

4 When the NDIS Drivers screen appears, select *Update NDIS Drivers* and press [Enter].

5 From the list of NDIS drivers, select the driver for the appropriate operating system and press [Enter].

6 Follow the instructions displayed in the subsequent screens.

Auto Select Media Type

The Auto Select Media Type function is implemented by the drivers contained on the 3C59X *EtherDisk* diskette supplied with the 3C595-T4 PCI adapter. This includes NetWare ODI drivers and NDIS 2.01 drivers. It also includes NDIS 3.0 drivers for Windows for Workgroups, Windows® 95, and Windows NT™. The NDIS drivers function with 486 and Pentium® processors.

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If you have one of these drivers installed, as soon as you connect a network cable to the system, the Auto Select Media Type function detects the type of cable making the connection and automatically selects that media type, which for the 3C595-T4 PCI adapter would be one of the UTP cable types, including Category 3, 4, or 5 UTP.

Transcend PC Link SmartAgent Driver Agents

3Com's SmartAgent® driver agents, which provide network management capabilities for adapters and PCs, are available with Transcend PC Link SmartAgent software or from 3Com's bulletin board service (BBS). (For information on 3Com's BBS, refer to Appendix D, "Technical Support.") The driver agents occupy less than 6 KB on client PCs. They are fully SNMP-compliant when used with SmartAgent SoftHub®/DOS or SoftHub/NLM software, one copy of which is included with each copy of Transcend PC Link SmartAgent and Transcend WorkGroup Manager software.

For more information on WorkGroup Manager software, contact your authorized 3Com representative.

Desktop Management Interface

3Com's support of the Desktop Management Interface (DMI) makes the management of PCs and 3C595-T4 PCI adapters easier. Support of DMI allows any DMI-compatible management application to seamlessly access 3Com adapter information.

3Com's SmartAgent driver agents can take full advantage of the Management Information File (MIF), which is included with the DMI software. DMI supports NetWare ODI DOS and NDIS DOS drivers.

For information about DMI software and instructions on how to install it, access 3Com's bulletin board service, as described in Appendix D.

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4 Performing Troubleshooting and Diagnostic Tests

This chapter explains how to isolate and solve 10/100BASE-T4 PCI adapter problems.

Make sure that the adapter is correctly installed. (See Chapter 2 for installation instructions.)

This chapter contains information about the following topics:

- Diagnostic tests overview
- Starting the diagnostic program
- Getting help if a test fails
- Changing the test setup
- Miscellaneous checks

The 3Com diagnostic program is a DOS program. If you are running an operating system or interface other than DOS, refer to the section "Accessing DOS" in Chapter 3.

Troubleshooting with the Diagnostic Tests

The diagnostic tests on the 3C59X *EtherDisk* diskette check the adapter's overall operation and permit the isolation of faults. You can run the diagnostic tests after installing the 10/100BASE-T4 PCI adapter, or when a fault is suspected. If the tests in their default configuration do not isolate the problem, you can change the test parameters to meet specific situations.

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Before Running the Tests

When the DOS operating system first loads, it executes the AUTOEXEC.BAT and CONFIG.SYS files. These files are user-definable files that set up the computer environment and may also load memory managers and drivers into memory.

If you are using DOS 6.x in a plain DOS environment, you can bypass the CONFIG.SYS and AUTOEXEC.BAT files by holding down the right shift key while starting the computer. If you are running under DOS 6.2, pressing [F5] while starting the computer will also bypass the same two files.

After performing the diagnostic tests, reboot your computer.

Types of Tests

The diagnostic tests are divided into three groups, of which only the Group 1 and Group 3 tests apply to the Fast EtherLink 10/100BASE-T4 PCI adapter.

The Group 1 test checks the physical components and circuitry on the adapter. These tests are run as default tests.

The Group 2 test (Network Loopback Test) is *not* used on twisted-pair adapters such as the Fast EtherLink 10/100BASE-T4 PCI adapter.

The Group 3 test (the Echo Exchange Test) tests the adapter's ability to transmit and receive data while on the network.

CAUTION: *Running the Group 3 test while connected to an active network can cause intermittent failures. To avoid this, connect to an inactive network on which only the computer being tested is operating.*

If you run the diagnostic tests successfully, you rule out a hardware failure on the computer. If the adapter passes all the tests and there still appears to be a problem, look at cabling, software, and other issues that affect functionality on the network.

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Starting the Diagnostic Program

Always run diagnostic tests with no device drivers or memory managers (EMM386.EXE and HIMEM.SYS) installed. Whenever you plan to run the diagnostic tests, you must first start your computer from a DOS diskette containing no device drivers, or you must exit to DOS if you have an operating system other than DOS. (Refer to the section "Accessing DOS" in Chapter 3.)

To use the 3C59X *EtherDisk* diskette Configuration and Diagnostic Program, follow these steps:

1 **In the main menu, select *Configuration/Diagnostic/ Troubleshooting* and press [Enter].**

Refer to Chapter 3 for instructions for accessing the main menu.

2 **When the Configuration and Diagnostic screen appears, select *Configuration and Diagnostic Program*, and press [Enter].**

If you are testing multiple adapters, a screen displaying descriptions of each installed adapter appears. Select the adapter you want to test and press [Enter]. A screen appears, showing the selected adapter.

3 **Continue with the instructions given in the next section, "Running the Group 1 Tests."**

Group 1 tests are the default.

You can also run the tests from the command line. At the system prompt, type:

```
3C595CFG
```

Running the Group 1 Tests

To run the Group 1 tests, follow these steps:

1 **Under the *Test* pull-down menu, select *Run Tests*. Press [Enter].**

The Run dialog box appears, with *Start* highlighted.

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2 Press [Enter] to start the tests.

Group 1 tests (the default setting) run ten times unless you specify otherwise. The test results are displayed on the screen in the Results column.

To run the tests continuously, go to the Repetitions box on the Test Setup screen, and select *Continuous* (and deselect *Halt on Error* in the Errors box).

The Group 1 tests include:

- Register Access Test
- EEPROM Test
- FIFO Loopback Test
- Ethernet Core Loopback Test
- Encoder/Decoder Loopback Test
- Interrupt Test

For a description of each Group 1 test, access help by pressing [F1].

Running the Group 3 Test

The Group 3 test (Echo Exchange Test) tests the adapter's ability to transmit and receive data while on the network.

To run the Group 3 test on the network, you need a second computer set up as an echo server. The echo server receives packets from the adapter being tested and echoes them back to the adapter.

The second computer must contain a 3Com adapter running at the same speed as the Fast EtherLink 10/100BASE-T4 PCI adapter (10 Mbps or 100 Mbps). The diagnostic program that comes with the Fast EtherLink PCI adapter supports the EtherLink III echo server diagnostic program.

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Setting Up an Echo Server

To test 10 Mbps operation of the 10/100BASE-T4 PCI adapter, use a computer as an echo server that contains an EtherLink III adapter or another 10/100BASE-T4 PCI adapter.

To test for 100 Mbps operation of the 10/100BASE-T4 PCI adapter, use another Fast EtherLink PCI adapter in the computer being used as the echo server.

In either case, select the *Echo Server* menu item under the *Test* menu, and click *Start* to make the computer an echo server.

If you are setting up an echo server on a computer with a 10 Mbps 3Com adapter other than an EtherLink III adapter, follow these steps:

1 **Select a computer to use as an echo server.**

2 **Insert the *EtherDisk* diskette for the installed adapter in a floppy drive.**

The *EtherDisk* diskette that accompanied the adapter contains the diagnostic program.

3 **Start the diagnostic program on the echo server.**

The diagnostic program that you use depends on the adapter board that is installed in the echo server. After the system prompt of the drive containing the Configuration and Diagnostic Program, enter the name of the program (3CXXX), as indicated in Table 4-1.

The diagnostic programs listed in Table 4-1 come on the *EtherDisk* diskette that accompanies the adapter.

4 **From the main menu, select *Echo Server Setup*.**

The program notifies you that your computer is now set up as an echo server.

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Table 4-1 Adapter and Diagnostic Program Names (10 Mbps Adapter Only)

Diagnostic Program Name	Adapter
3C503	EtherLink II® or II TP EtherLink II/16 or II/16 TP
3C505	EtherLink Plus®
3C507	EtherLink 16 or EtherLink 16 TP
3C5X9CFG	EtherLink III family
3C523	EtherLink/MC
3C523TP	EtherLink/MC TP
3C527	EtherLink/MC 32
3C589CFG	EtherLink III PC Card family
3C59XCFG	EtherLink III PCI/EISA Bus Master family

Starting the Group 3 Test

To run the Group 3 test on a Fast EtherLink PCI adapter, follow these steps:

1. **Start the Configuration and Diagnostic Program.**

   This program must be on the computer containing the adapter you want to test.

2. **Select *Test Setup* from the *Test* menu.**

3. **Select *Group 3* from the Group Select box.**

4. **Enable the Group 3 test by highlighting *Enable Group*.**

5. **Select *OK* and press [Enter].**

6. **Go to the Run dialog box to start the tests.**

7. **After the test is completed:**

   a End the program on the echo server.

   b Exit the diagnostic program.

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Getting Help If a Test Fails

If any test fails, you can get additional information as follows:

1 **Highlight the test that failed in the Run Tests dialog box and press [Enter].**

2 **Highlight the *Zoom* button and press [Enter].**

If the diagnostic tests fail, the adapter may not be defective. The problem may be caused by incorrect option settings, option settings that conflict with the settings of other boards, or improper installation. Complete the following steps to test the adapter further.

CAUTION: *Make sure to turn the power off and disconnect all cables from the adapter before inserting or removing it from the computer.*

- Check the adapter installation by reviewing the installation instructions in Chapter 2.

  Make sure the adapter is seated correctly in the slot.

- Inspect all cables and connections.

- Make sure that the PCI slot containing the adapter is activated.

  PCI computers allow PCI slots to be activated or deactivated through the computer's BIOS setup, or in some cases, with a special PCI utility. Refer to your computer documentation for information about activating PCI slots.

  In addition, bus mastering is not supported on all PCI slots in all computers. The Fast EtherLink PCI adapter provides better performance in a bus master slot, but will work in a non-bus master slot. Refer to your computer documentation.

  The original slot may be defective.

- Make sure that you booted your computer under DOS version 3.1 or later, and that no device drivers or memory managers are loaded.

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- If you are running the Group 3 test, make sure that the adapter is connected to a properly cabled and inactive network and that an echo server is set up on the network.
- Replace the failed adapter with a working adapter and run the diagnostic tests again.

  If the working adapter passes all tests, the original adapter is probably defective. For information on returning products for repair, refer to Appendix D, "Technical Support."
- Install the adapter in another functioning PCI computer and run the tests again.

  Your computer may be defective. If the adapter passes the tests in the second computer, contact the reseller or manufacturer of the original computer.
- Replace all other PCI adapters from the computer and run the tests again. If the tests pass, the other PCI adapters may be causing contention.
- If you experience problems that occur only when using the AutoLink program, display or print the AUTOLINK.LOG file as follows:
  - To display the file, type:

    ```
    type autolink.log | more
    ```
  - To print the file, type:

    ```
    print autolink.log
    ```

  The AUTOLINK.LOG file contains a log of all the events that occurred during the AutoLink installation and configuration process.

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Changing the Test Setup

To change the test parameters, follow these steps:

1. **Choose *Test Setup* from the *Test* menu in the main window of the Configuration and Diagnostic Program, or select the *Test Setup* button in the Run Tests dialog box.**

2. **Press [Tab] to highlight any of the fields within the Test Setup dialog box.**

3. **To change a setting in any field, follow these steps:**

   a In the Group Select box, use the arrow keys to select a test group.

   b In the Group X Tests box, use the arrow keys to highlight a test. Press the [Space Bar] to enable or disable an individual test.

   c In the Repetitions box, specify the number of times you want to run the tests, or use the arrow keys to select the *Continuous* option.

   d In the Errors box, press the [Space Bar] to select or deselect the *Halt on Error* parameter.

4. **When you are satisfied with the new test setup, highlight the *OK* button and press [Enter].**

5. **To run the tests, choose *Run Tests* from the *Test* menu and select the *Start* button.**

Miscellaneous Checks

Check for specific hardware problems, such as broken traces or loose/broken solder connections.

If you have installed the adapter correctly and you still experience problems, check the software.

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Check the length and rating of the UTP cable connection. Make sure the cable segment is compliant with 10BASE-T or 100BASE-T4 specifications. Maximum length for all types of cabling for this adapter is 100 meters (330 feet).

Make sure that you have installed the correct driver for the network operating system you are running (refer to Chapter 3, "Loading the Network Drivers").

If any problem persists, refer to Appendix D, "Technical Support."

LEDs

Each 10/100BASE-T4 PCI adapter has three LEDs, as shown in Figure 1-1 and described in Table 4-2.

The adapter must be physically connected to the network and network drivers must be loaded for the LEDs to work.

Table 4-2 Fast EtherLink 10/100BASE-T4 PCI Adapter LEDs

LED	Description	Flashing	Steady	Off
10 LNK	Green: Shows link integrity	Reversed cable polarity	Good 10BASE-T connection between adapter and hub	No connection between adapter and hub
100 LNK	Green: Shows link integrity	Not applicable	Good 100BASE-T4 connection between adapter and hub	No connection between adapter and hub
ACT	Yellow: Indicates port traffic for either speed	Network traffic present	Not applicable	No traffic

If you experience any problems, first make sure that the appropriate driver is loaded, that the proper cable is connected to the adapter port, and that the hub complies with the adapter specifications (10 Mbps 10BASE-T or 100 Mbps 100BASE-T4). Then recheck the LED.

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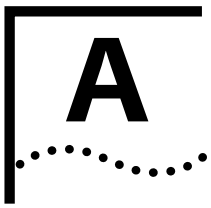

Cabling

This appendix discusses the following topics:

- Adapter cabling requirements
- Twisted-pair cable and the EIA/TIA cable categories
- 10BASE-T operation and specifications
- 100BASE-T specifications, including 100BASE-TX, 100BASE-T4, and 100BASE-FX
- Pin assignments for the RJ-45 connector

Adapter Cabling Requirements

When properly connected to a 10BASE-T network, the Fast EtherLink 10/100BASE-T4 PCI adapter operates in 10BASE-T mode and requires standard 10BASE-T cable topologies and types, including 2 pairs of Category 3, 4, or 5 UTP for 10 Mbps.

When properly connected to a 100BASE-T4 network, the Fast EtherLink PCI adapter operates in 100BASE-T4 mode and requires 4 pairs of Category 3, 4, or 5 UTP for 100 Mbps.

In either case, the cable, quality, distance, and connectors must comply with the EIA/TIA 568 "Commercial Building Wiring Standard" and the Technical Services Bulletin TSB38 standards.

The maximum UTP cable distance is 100 meters (330 feet) at either speed.

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Twisted-Pair Cable

Twisted-pair cable consists of copper wires surrounded by an insulator. Two wires are twisted together (the twisting prevents interference problems) to form a pair, and the pair forms a circuit that can transmit data. A cable is a bundle of one or more twisted pairs surrounded by an insulator.

Unshielded twisted pair (UTP) is the most commonly-used type of twisted-pair cable. Shielded twisted pair (STP) provides protection against crosstalk. Twisted-pair cable is now commonly used in Ethernet, Fast Ethernet, token ring, and other network topologies.

The Electronic Industries Association/Telecommunications Industries Association (EIA/TIA) defines the following five categories of twisted-pair cable:

- **Category 1**—Traditional telephone cable.
- **Category 2**—Cable certified for data transmissions up to 4 MHZ.
- **Category 3**—Used for voice and data transmission up to 16 Mbps. The cable has four pairs of wires and three twists per foot. Category 3 is the most common type of previously installed cable found in corporate wiring schemes and normally contains 4 pairs in a bundle.
- **Category 4**—Used for voice and data transmission up to 20 Mbps. The cable normally has four pairs of wire. This grade of UTP is not common.
- **Category 5**—Used for voice and data transmission up to 100 Mbps. The cable normally has four pairs of copper wire. Category 5 is the most popular cable used in new installations today.

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10BASE-T Operation

10BASE-T is the Institute of Electrical and Electronics Engineers (IEEE) 802.3 standard for Ethernet signaling over unshielded twisted-pair wire at 10 Mbps.

Ethernet, as the most widely-used network protocol, uses 10BASE-T as its primary cabling scheme. Ethernet's characteristics include:

- A data rate of 10 Mbps
- A maximum station separation of 2.8 kilometers (1.7 miles) using fiber
- A broadcast architecture
- A specific media-access control (MAC) scheme

The specified networking technology for Ethernet is its MAC protocol called Carrier Sense Multiple Access with Collision Detection (CSMA/CD). Ethernet uses CSMA/CD to prevent network failures or collisions when two devices try to access the network at the same time.

10BASE-T Specifications

The 10BASE-T name indicates a signaling speed of 10 Mbps and twisted-pair wiring. *Base* stands for baseband, which denotes a technique for transmitting signals as direct-current pulses rather than being modulated onto separate carrier frequencies. This is a feature of the Ethernet architecture.

A wiring topology using 10BASE-T specifies a wiring hub, cable arranged in a star configuration, and unshielded twisted-pair cable. Each node has a separate cable run that must not exceed 328 feet (100 meters) from the node to the hub.

The 10BASE-T four-repeater (hub) rule states that you can use no more than four repeaters between major LAN segments. If you add a fifth repeater, the timing of the packets can be impaired and the CSMA/CD media-sharing scheme may break down.

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100BASE-T Standard

The 100BASE-T standard defines a network architecture based on the 10BASE-T standard that retains almost all of the original IEEE 802.3 Ethernet specification, while greatly increasing the network's overall throughput.

100BASE-T has the following similarities to 10BASE-T:

- Uses the same CSMA/CD access method and MAC functions
- Retains a hub-based architecture
- Runs over unshielded twisted-pair or fiber cabling
- Employs the same network management tools

The maximum span of a 100BASE-T network using only twisted-pair cable is 205 meters (672.4 feet).

100BASE-T media specifications allow Fast Ethernet to run on the most common Ethernet wiring, including Categories 3, 4, and 5 unshielded twisted-pair, shielded twisted-pair, and fiber.

100BASE-TX Operation

100BASE-TX designates the IEEE 802.3 specification for 100 Mbps with CSMA/CD over two pairs of Category 5 UTP or STP wire. Most 100BASE-TX equipment only supports 100 ohm UTP cable. The pairs of wires used for transmitting and receiving signals are the same as those used for 10BASE-T. This means that the same cabling used for 10BASE-T can be used for 100BASE-TX with no change to cable termination. Also, the connectors used for 100BASE-TX at the hub or end station are the common Category 5 certified RJ-45 connector for UTP.

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100BASE-T4 Operation

100BASE-T4 is the IEEE 802.3 specification for Ethernet signaling for 100 Mbps over four pairs of Category 3 or better UTP cable.This physical layer standard was specifically defined to allow 100BASE-T to be deployed over the large installed base of Category 3 voice-grade UTP.

100BASE-T4 uses four pairs of Category 3, 4, or 5 UTP cable, at distances of up to 100 meters. Transmission requires four pairs of cable to lower emissions and meet FCC requirements. You must have four pairs of UTP available for each node to run 100BASE-T4.

100BASE-FX Operation

100BASE-FX is the IEEE 802.3 specification for 100 Mbps Ethernet signaling over two strands of fiber cabling. 100BASE-FX is used for transmissions over extended distances (up to 2 kilometers [1.24 miles] between nodes), downlinks, and backbones, and is especially useful in any environment subject to electrical interference.

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RJ-45 Connector Pin Assignments

Figure A-1 shows the RJ-45 connector pin assignments.

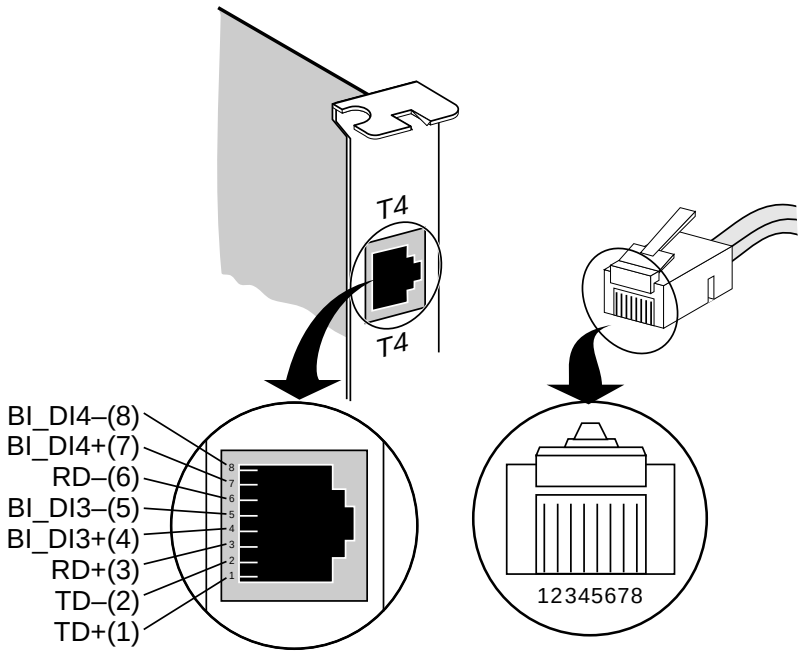

Figure A-1 RJ-45 Connector Pin Assignments

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B Configuring Software Settings

The Fast EtherLink 10/100BASE-T4 PCI adapter is automatically configured by the PCI's computer's BIOS with the following basic configuration parameters:

- I/O Port Address
- Interrupt Request Level (IRQ)

This is done automatically when the computer with the installed Fast EtherLink PCI adapter is turned on for the first time after installation of the adapter. Other required parameters are preset on the adapter so that it will function without further action.

Additional default settings can be changed in the following situations:

- You have a boot PROM.
- You want to manually select the network speed for the adapter.
- You want to optimize driver performance for Windows.
- You want to enable the Full Duplex option for 10 Mbps operation.

The Full Duplex setting can only be utilized in a 10 Mbps network with a hub or a switch that supports it.

Table B-1 lists each software option and the options' default setting and available settings. Refer to the on-line help (press [F1] when the option is highlighted) for more information about each setting.

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Table B-1 Option Settings

Option	Default Setting	Available Settings
Boot PROM	Disabled	Disabled, 8 K, 16 K, 32 K, 64 K
Media Type	10BASE-T	100BASE-T4, 10BASE-T, Auto Select
Network Driver Optimization*	Normal	Normal, Minimize CPU Utilization, Maximize Network Performance
Full Duplex†	Disabled	Enabled (10 Mbps only), Disabled

* This option specifies whether to optimize the network driver for a normal environment, a minimized CPU utilization environment, or a maximized network performance environment. You may choose to use a larger percentage of CPU resources under DOS in order to improve network throughput.

  In multitasking environments, choosing the Minimize CPU Utilization option saves the resources of the CPU for other tasks. If no other applications are making major demands on CPU resources, you may choose the Maximize Network Performance option.

† Full duplex operation is possible only in 10 Mbps operation when used in an environment where the switch supports it. Do not enable the Full Duplex option unless your switching hub is set for full duplex.

Changing Software Settings

To change the software option settings, follow these steps:

If this computer is an operating server, notify all users of the server to save their work and log out from the network. The Configuration and Diagnostic Program disrupts the normal operation of servers and workstations, so work that is not saved may be lost.

1. **Make sure the 10/100BASE-T4 PCI adapter has been properly installed in your computer.**

2. **Boot your computer under DOS, version 3.1 or later.**

3. **Place the *EtherDisk* diskette in a floppy drive on your computer and make that drive the active drive. For example:**

   ```
   A: [Enter]
   ```

4. **Type at the prompt:**

   ```
   Install [Enter]
   ```

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5 When the auto installation screen appears, as shown in Figure 3-1 press [Enter].

6 When the main menu appears with a list of options, as shown in Figure 3-2, select *Configuration/Diagnostic/ Troubleshooting*.

7 When the Configuration and Diagnostic screen appears, select *Configuration and Diagnostic Program*.

8 Do one of the following:

a If you have multiple adapters installed, as shown in Figure B-1, use the arrow keys to select the desired adapter and press [Enter]. When the *Configure Adapter* option is highlighted on the *Install* pull-down menu, press [Enter] again.

b If you have a single adapter installed, the *Configure Adapter* option appears already highlighted on the *Install* pull-down menu. Press [Enter].

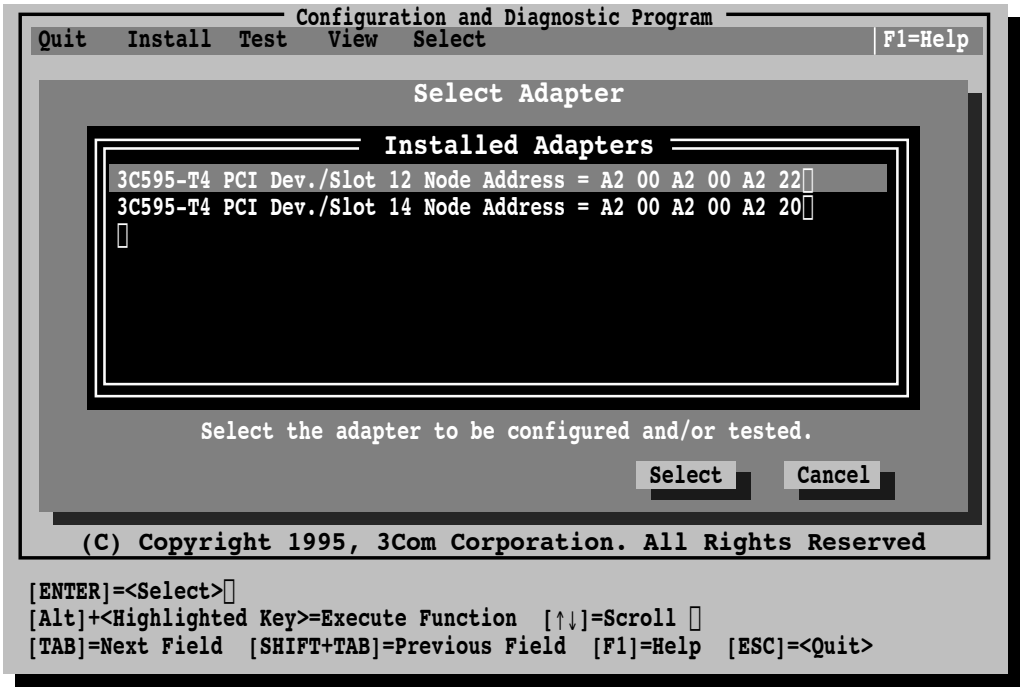
Configuration and Diagnostic Program
Quit Install Test View Select F1=Help
Select Adapter
Installed Adapters
3C595-T4 PCI Dev./Slot 12 Node Address = A2 00 A2 00 A2 22
3C595-T4 PCI Dev./Slot 14 Node Address = A2 00 A2 00 A2 20
Select the adapter to be configured and/or tested.
Select
Cancel
(C) Copyright 1995, 3Com Corporation. All Rights Reserved
[ENTER]=<Select>
[Alt]+<Highlighted Key>=Execute Function [↑↓]=Scroll
[TAB]=Next Field [SHIFT+TAB]=Previous Field [F1]=Help [ESC]=<Quit>

Figure B-1 Multiple Adapter Option Configuration33

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In both cases, a screen similar to the one shown in Figure B-2 appears, showing the parameters for the selected adapter.

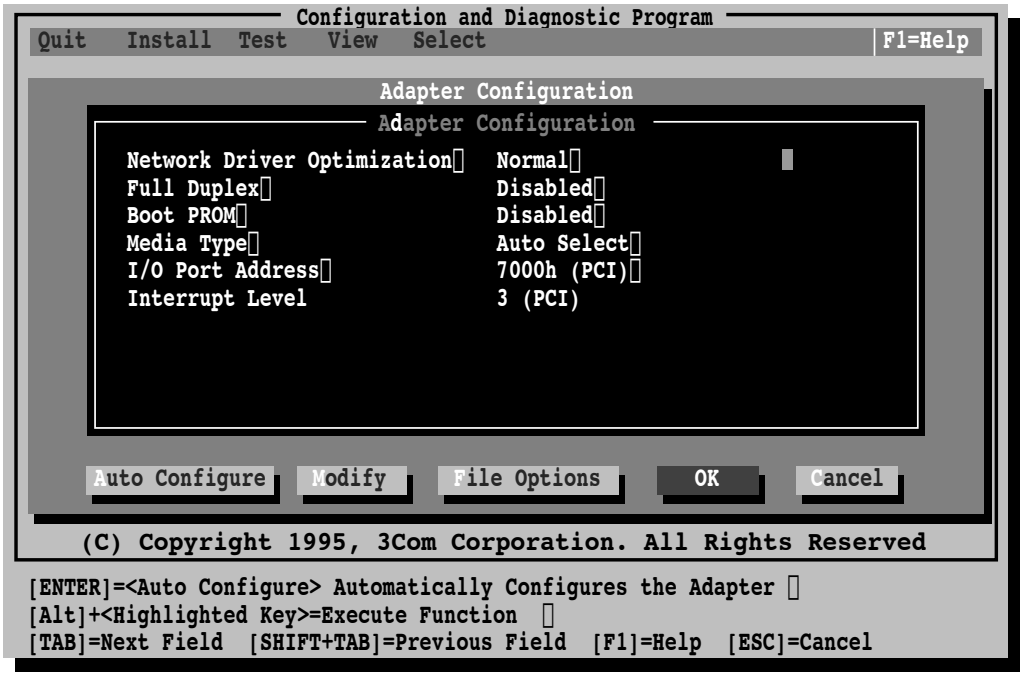
Configuration and Diagnostic Program
Quit Install Test View Select F1=Help
Adapter Configuration
Adapter Configuration
Network Driver Optimization Normal
Full Duplex Disabled
Boot PROM Disabled
Media Type Auto Select
I/O Port Address 7000h (PCI)
Interrupt Level 3 (PCI)
Auto Configure Modify File Options OK Cancel
(C) Copyright 1995, 3Com Corporation. All Rights Reserved
[ENTER]=<Auto Configure> Automatically Configures the Adapter
[Alt]+<Highlighted Key>=Execute Function
[TAB]=Next Field [SHIFT+TAB]=Previous Field [F1]=Help [ESC]=Cancel

Figure B-2 Changing Adapter Options

9 Press [Tab] to highlight the main dialog box, and use the arrow keys to highlight one of the parameter options. Press [Enter].

A second dialog box appears.

10 Use the arrow keys to scroll through the list of settings for that option. Select a setting and press [Enter].

11 Continue this procedure with any of the other options.

Refer to the on-line help (press [F1] when the option is highlighted) for more information about each of the settings.

12 Press [Tab] to highlight *OK*. Press [Enter].

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You must highlight OK *and press [Enter] to save the settings. If you want to use the same settings on other adapters, you can save the configuration settings to a file. Select* Save *under* File Options *in the Adapter Configuration dialog box. For example, type:*

```
D:\CONFIG\3C595.SET
```

This saves the settings to the default file 3C595.SET in the CONFIG directory in drive D. Refer to the on-line help (press [F1]) for more information.

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C SPECIFICATIONS

This appendix lists the specifications for the Fast EtherLink 10/100BASE-T4 PCI adapter. It also contains pin assignments for the adapter's RJ-45 connector.

Adapter Specifications

Network Interface

10 Mbps Ethernet 10BASE-T	Ethernet IEEE 802.3 industry standard for a 10 Mbps baseband CSMA/CD local area network
100 Mbps Ethernet 100BASE-T4	Ethernet IEEE 802.3u industry standard for a 100 Mbps baseband CSMA/CD local area network

Physical Dimensions

Length:	17.46 cm (6.9 in)
Height:	10.67 cm (4.2 in)

Environmental Operating Range

Operating temperature:	0˚ to 70˚ C (32˚ to 158˚ F)
Humidity:	10 to 90% noncondensing
Altitude:	To 3,000 meters (9,840 ft)

Power Requirements

Operating voltage:	+5 V ± 5% @ 1.0A max

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D TECHNICAL SUPPORT

3Com provides easy access to technical support information through the variety of services described in this appendix.

On-line Technical Services

3Com offers worldwide product support seven days a week, 24 hours a day, through the following on-line systems:

- 3Com Bulletin Board Service (3ComBBS)
- World Wide Web site
- 3ComForum on CompuServe®
- 3ComFacts℠ automated fax service

3Com Bulletin Board Service

3ComBBS contains patches, software, and drivers for all 3Com products, as well as technical articles. This service is available via modem or ISDN seven days a week, 24 hours a day.

Access by Modem

To reach the service by modem, set your modem to 8 data bits, no parity, and 1 stop bit.

Call the telephone number nearest you:

Country	Data Rate	Telephone Number
Australia	up to 14400 bps	(61) (2) 9955 2073
France	up to 14400 bps	(33) (1) 69 86 69 54
Germany	up to 9600 bps	(49) (89) 627 32 188 **or** (49) (89) 627 32 189
Hong Kong	up to 14400 bps	(852) 2537 5608
Italy (fee required)	up to 14400 bps	(39) (2) 273 00680

(continued)

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Country	Data Rate	Telephone Number
Japan	up to 14400 bps	(81) (3) 3345 7266
Singapore	up to 14400 bps	(65) 534 5693
Taiwan	up to 14400 bps	(886) (2) 377 5838
U.K.	up to 28800 bps	(44) (1442) 278278
U.S.	up to 28800 bps	(1) (408) 980 8204

Access by ISDN

ISDN users can dial-in to 3Com BBS using a digital modem for fast access up to 56 Kbps. To access 3ComBBS using ISDN, dial the following number:

(408) 654-2703

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`http://www.3Com.com/`

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3ComForum on CompuServe

3ComForum is a CompuServe-based service containing patches, software, drivers, and technical articles about all 3Com products, as well as a messaging section for peer support. To use 3ComForum, you need a CompuServe account.

To use 3ComForum:

1. **Log on to CompuServe.**
2. **Enter `go threecom`.**
3. **Press [Return] to see the 3ComForum main menu.**

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Call 3ComFacts using your touch-tone telephone. International access numbers are:

Country	Fax Number
Hong Kong	(852) 2537 5610
U.K.	(44) (1442) 278279
U.S.	(1) (408) 727 7021

Local numbers are available within the following countries:

Country	Telephone Number
Australia	800 123853
Belgium	0800 71279
Denmark	800 17319
Finland	98 001 4444
France	05 90 81 58
Germany	0130 8180 63
Italy	1678 99085

Country	Telephone Number
Netherlands	06 0228049
Norway	800 11062
Portugal	0505 442607
Russia (Moscow only)	956 0815
Spain	900 964445
Sweden	020 792954
U.K.	0800 626403

Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- Diagnostic error messages
- A list of system hardware and software, including revision levels

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- Details about recent configuration changes, if applicable

If you are outside the U.S. and Canada, contact your local 3Com sales office to find your authorized service provider:

Country	Telephone Number	Country	Telephone Number
Australia (Sydney)	(61) (2) 959 3020	Japan	(81) (3) 33457251
(Melbourne)	(61) (3) 653 9515	Mexico	(525) 531 0591
Belgium*	0800 71429	Netherlands*	06 0227788
Brazil	(55) (11) 546 0869	Norway*	800 13376
Canada	(905) 882 9964	Singapore	(65) 538 9368
Denmark*	800 17309	South Africa	(27) (11) 803 7404
Finland*	0800 113153	Spain*	900 983125
France*	05 917959	Sweden*	020 795482
Germany*	0130 821502	Taiwan	(886) (2) 577 4352
Hong Kong	(852) 868 9111	United Arab Emirates	(971) (4) 349049
Ireland*	1 800 553117	U.K.*	0800 966197
Italy*	1678 79489		

* These numbers are toll-free.

Returning Products for Repair

A product sent directly to 3Com for repair must first be assigned a Return Materials Authorization (RMA) number. A product sent to 3Com without an RMA number will be returned to the sender unopened, at the sender's expense.

To obtain an RMA number, call or fax:

Country	Telephone Number	Fax Number
U.S. and Canada	(800) 876 3266, option 2	(408) 764 7120
Europe	31 30 60 29900, option 5	(44) (1442) 275822
Outside Europe, U.S., and Canada	(1) (408) 492 1790	(1) (408) 764 7290

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GLOSSARY

10BASE-T

The IEEE 802.3 standard for a 10 Mbps baseband network on twisted-pair cable.

100BASE-FX

The IEEE 802.3 standard for a 100 Mbps baseband network over two optical fibers.

100BASE-T

The IEEE 802.3 standard for a 100 Mbps baseband network over twisted-pair cable.

100BASE-T4

The IEEE 802.3 standard for a 100 Mbps baseband network over four pair Category 3, 4, or 5 UTP wire.

100BASE-TX

The IEEE 802.3 standard for a 100 Mbps baseband network over two pair Category 5 UTP or STP wire.

ANSI

American National Standards Institute. A coordinating organization that publishes electronics standards for use in the United States.

AutoLink

Auto-installation and auto-configuration software for NetWare DOS clients. It automatically configures the adapter by selecting the correct interrupt level and I/O base address, checking for the network connection, and detecting the correct frame type.

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Auto Select Media Type

A utility that detects the type of network cable connected to the adapter and automatically selects that connection for packet transmission. This function is implemented by all NetWare ODI, Windows for Workgroups, NDIS 2.01, Windows NT, and Windows 95 drivers.

Broadcast architecture

The signaling scheme in which every node receives every broadcast from every other node at the same time.

Bus

An electronic pathway along which signals are transmitted from one area of a computer to another.

Bus master adapter

An adapter that contains its own processor, which allows the adapter to operate independently of the computer's main processor.

CSMA/CD

Carrier Sense Multiple Access with Collision Detection. A media-sharing scheme in which stations listen in to what is happening on the network media. If the cable is not in use, the station is permitted to transmit its message. If two or more nodes simultaneously start to transmit, a collision results. In this case each node stops transmitting for a specified interval of time, and then transmits the signal when the cable is clear.

DMI

Desktop Management Interface. The management scheme, developed by the Desktop Management Task Force (DMTF), to make management of a PC easier through standardized means of access to information from managed devices. The standard supported by the DMI defines how information on PCs is made available and accessible.

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EIA/TIA

Electronics Industries Association/Telecommunications Industries Association. The organization that develops wiring standards for the telecommunications industry. The EIA/TIA 568 specification applies to all unshielded twisted-pair wiring schemes that work with Ethernet, Token Ring, ISDN and other networks.

EISA

Extended Industry Standard Architecture. The EISA 32-bit extended AT personal computer bus architecture is downward compatible with the 16-bit ISA architecture.

EMM386

Expanded Memory Manager. A dual-purpose memory manager that comes with MS-DOS. It provides access to the upper memory area, which enables you to free conventional memory by running device drivers in upper memory. EMM386 also uses extended memory to simulate expanded memory. Refer to Microsoft documentation for additional information.

Ethernet

A local area network standard defining a physical medium and its method of placing data, or packet signaling, on a cable. Access to the cable is based on CSMA/CD (carrier sense multiple access with collision detection).

ISA

Industry Standard Architecture. A 16-bit extension of the original IBM® PC bus architecture. The IBM Personal Computer AT® bus.

Loopback

A type of diagnostic test in which the transmitted signal is returned to the sending device after passing through all, or a portion of, a data communications link or network. A loopback test permits the comparison of a returned signal with the transmitted signal.

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MAC

Media access control. The operational scheme that gives each network node orderly access to the network cable. CSMA/CD is a MAC protocol that determines how nodes on the network share access to the cable.

NDIS

Network Driver Interface Specification. Defines the LAN Manager network driver architecture and interfaces that let a DOS or OS/2 system support network adapters. This architecture provides a standardized way to write drivers for network adapters.

NetWare

A series of network operating systems and related products made by Novell, Inc.

ODI driver

Open Data-Link Interface. A MAC-level specification developed by Novell and Apple®. Drivers complying with this specification can work with NetWare 2.x, 3.x, and 4.x. Like NDIS, ODI drivers support multiple protocols and adapters, and can be unloaded from memory to conserve conventional DOS RAM space.

Parallel Tasking

3Com's third-generation Ethernet adapter architecture. Parallel Tasking technology accelerates data transfer by processing data packets simultaneously instead of sequentially. For example, when transmission is the task, the Parallel Tasking architecture begins to write data to the network even before an entire frame has been loaded into the adapter's buffer memory. This permits complete parallelism in all data transfers.

PCI

Peripheral Component Interconnect. An advanced high-performance local bus that supports multiple peripheral devices. At 33 MHz, the PCI bus transfers 32 bits of data at up to 132 Mbps.

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STP

Shielded twisted-pair cable. Twisted-pair cabling with an overall shield to prevent the entry of outside interference, and individually shielded and twisted-pairs to prevent crosstalk.

Transcend

3Com's integrated network management solution based on groups of logically related devices and including a variety of network management tools.

Twisted-pair

Wiring similar to that found in the telephone system, consisting of two insulated wires loosely twisted around each other to help cancel out induced noise in balanced circuits.

UTP

Unshielded twisted-pair cable. Twisted-pair cabling that does not have individual or overall shielding. The cable contains two or more pairs of twisted copper wires.

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INDEX

Numerics

10/100BASE-T4 PCI adapter 1-3
100BASE-FX
  description A-5
100BASE-T
  media specifications A-4
  standard A-4
100BASE-T4
  description A-5
  Fast Ethernet 1-1
100BASE-TX
  description A-4
  Fast Ethernet 1-1
10BASE-T
  Ethernet, 10 Mbps 1-1
  specifications A-3
  three-repeater rule A-3
  twisted-pair cable 1-2, A-3
3C595.SET B-5
3C595-T4 1-1
3C59X drivers 3-11
3C59X.LAN server driver 3-11
3C59XCFG 4-3
3Com Bulletin Board Service (3ComBBS) D-1
3Com sales offices D-4
3ComFacts D-3
3ComForum D-2
802.3 IEEE standard 1-2

A

adapter
  cabling requirements 1-3, A-1
  compatibility feature 1-1
  connecting to network 2-3
  diagnostic tests 4-1
  features 1-3
  installation capability 1-2
  installing 2-2
  loading drivers 3-1
  specifications C-1
  troubleshooting 4-1
adapter and diagnostic test programs 4-6
adapters
  multiple 3-8, 3-11
Artisoft LANtastic 3-11
Auto Select Media Type 1-3, 3-12
AUTOEXEC.BAT file 3-5, 4-2
AutoLink auto installation software 1-3, 3-5
  requirements 3-5
  using 3-6
AUTOLINK.LOG file 3-8

B

Banyan VINES Client 3-11
boot PROM
  installation 2-2
  option setting B-2
bulletin board service D-1

C

cabling requirements 1-3, 2-4, 2-5, A-1
Carrier Sense Multiple Access with Collision Detection (CSMA/CD) A-3
changing diagnostic test setup 4-9
command line, using 4-3
comparing PCI and EISA slots 2-3
CompuServe D-2
CONFIG.SYS file 3-5, 4-2
Configuration and Diagnostic Program
  main menu 3-7
configuration, automatic 1-1
configuring software settings B-1
connecting to the network 2-3
conventions
  notice icons 2
  text 2
CPU utilization B-2

Downloaded from www.Manualslib.com manuals search engine

D

DEC PATHWORKS 3-11
default option settings B-2
Desktop Management Interface (DMI) 1-3, 3-13
diagnostic program, starting 4-3
diagnostic tests 4-1
  changing test setup 4-9
  echo server 4-5
  failed 4-7
  for specific adapters 4-6
  Group 1 4-2, 4-3, 4-4
  Group 2 4-2
  Group 3 (Echo Server) 4-2, 4-4
  starting 4-3
DOS 3-6
  accessing 3-2
DOS NDIS 3-12
DOS ODI client 1-3, 3-5, 3-7, 3-8
driver agents 3-13
drivers 1-1, 3-1
  compatibility 3-2
  NDIS 3-11, 3-12
  NetWare ODI 3-5
  summary of loading procedures 3-1
  Windows 95 3-3

E

echo exchange test 4-2
echo server test 4-5
EIA/TIA 568 standards A-1
end-user software license agreement 3-6
EtherDisk diskette 3-2, 3-5, 3-6, 3-8, 3-10, 3-11, 4-1
Ethernet protocol, characteristics of A-3

F

fax service. *See* 3ComFacts
fiber-optic cabling A-5
full duplex B-1, B-2

G

Group 1 tests 4-4
Group 3 test 4-4

H

help information 3-4, 4-4

I

I/O Address B-1
IBM LAN Server 3-11
installation
  adapter 2-2
  boot PROM 2-2
  changing software options B-1
interrupt request level (IRQ) B-1

L

LAN Server 3-11
LEDs 4-10
LINK DRIVER 3C59X section 3-9
loading drivers
  NDIS 3-12
  NetWare 3-5
  other NOSs 3-11
  summary 3-1
  Windows 95 3-3

M

MAC protocol A-3
making valid hub connections 2-4
Management Information File (MIF) 3-13
Media Type option setting B-2
Microsoft LAN Manager 3-11
multiple adapters
  client 3-8
  server 3-11

N

NDIS drivers 3-11, 3-12
NET.CFG file 3-9, 3-10
NetWare
  4.x server driver 3-11
  DOS ODI client driver 3-5, 3-6
  Loadable Modules (NLMs) 3-11
  with multiple adapters 3-8, 3-11
NETWARE\SERVER subdirectory 3-11

Downloaded from www.Manualslib.com manuals search engine

network
connecting to 2-3
management 3-13
Network Driver Optimization option setting B-2
network supplier support D-3
NWCLIENT subdirectory 3-9

O

on-line
help 3-4
on-line technical services D-1
option settings
changing B-2
OS/2 3-3
NDIS driver 3-12

P

package contents 2-1
Parallel Tasking, benefits of 1-3
PATHWORKS 3-11
PCI 1-1
slots 2-2, 4-7
specification 1-4
technology 1-4
pin assignments A-6
port number, finding 3-10

Q

QINSTALL\SERVER directory 3-5

R

readme files 3-5, 3-11
returning products for repair D-4
reversed cable polarity 4-10
RJ-45 connector pin assignments A-6

S

safety precautions 2-1
server driver, NetWare 3-11
shared slots 1-4
shielded twisted pair (STP) cable A-2
slots
bus master 1-2
PCI 2-2, 4-7
shared 1-4
SmartAgent software 3-13
software option settings
changing B-2
default B-2
saving B-5
specifications
adapter C-1
cabling requirements A-1
STP wire A-2, A-4

T

technical support D-1
tests, diagnostic. *See* diagnostic tests
Transcend PC Link SmartAgent network management software 3-13
Transcend WorkGroup Manager 1-2
troubleshooting
diagnostic tests 4-1
tips 4-7
twisted-pair cable
10BASE-T 1-2, A-3
categories A-2
description A-2

U

unshielded twisted pair (UTP) cable 1-1, A-2
updating NDIS drivers 3-12

V

VINES 3-11

Downloaded from www.Manualslib.com manuals search engine

W

Windows 3.X 3-3
Windows 95
    confirming adapter installation 3-4
    loading the driver 3-3
Windows for Workgroups 3-12
Windows NT 3-12
wiring requirements
    100BASE-T4 2-4
    10BASE-T 2-4

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Internetworking products	**One year**
Network adapters	**Lifetime**
Ethernet stackable hubs and unmanaged Ethernet fixed port repeaters	**Lifetime* (One year if not registered)**
***Power supply and fans in these stackable hubs and unmanaged repeaters**	**One year**
Other hardware products	**One year**
Spare parts and spares kits	**90 days**

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FCC CLASS B CERTIFICATION

3Com Corporation
Model No: 3C595-T4
FCC ID: DF63C595-T4
Made in U.S.A.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1 this device may not cause harmful interference, and

2 this device must accept any interference received, including interference that may cause undesired operation.

WARNING: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules, and the Canadian Department of Communications Equipment Standards entitled, "Digital Apparatus," ICES-003. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from the one which the receiver is connected to.
- Consult the dealer or an experienced radio/TV technician for help.

The user may find the following booklet prepared by the Federal Communications Commission helpful:

*The Interference Handboo*k

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 004-000-00345-4.

NOTE: In order to maintain compliance with the limits of a Class B digital device, 3Com requires that you use quality interface cables when connecting to this device. Changes or modifications not expressly approved by 3Com could void the user's authority to operate this equipment. Refer to the manual for specifications on cabling types.

CISPR B COMPLIANCE

This device complies with the EMC directive of the European Community and meets or exceeds the following technical standard:

EN 55022 – Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.

This device complies with the CISPR Class B standard.

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CE NOTICE

Marking by the symbol CE indicates compliance of this equipment to the EMC directive of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards:

- EN 55022—"Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment."
- EN 50082-1—"Electromagnetic compatibility —Generic immunity standard Part 1: Residential, commercial, and light industry."
- IEC 801-2—"Electromagnetic compatibility for industrial-process measurement and control equipment Part 2: Electrostatic discharge requirements."—Severity level 3.
- IEC 801-3—"Electromagnetic compatibility for industrial-process measurement and control equipment Part 3: Radiated electromagnetic field requirements."—Severity level 2.
- IEC 801-4—"Electromagnetic compatibility for industrial-process measurement and control equipment Part 4: Electrical fast transient/burst requirements."—Severity level 2.
- A "Declaration of Conformity" in accordance with the above standards has been made and is on file at 3Com Corporation.

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